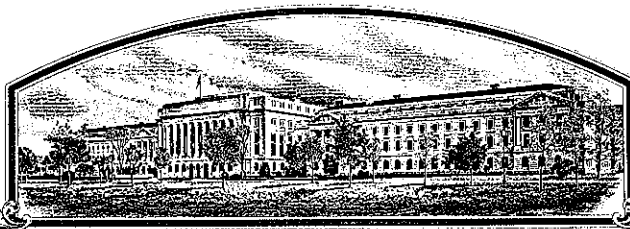


No.

9200221



# THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

**Pioneer Hi-Bred International, Inc.**

Whereas, THERE HAS BEEN PRESENTED TO THE

**Secretary of Agriculture**

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT (1930, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

ALFALFA

'Capital'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this 30th day of April in the year of our Lord one thousand nine hundred and ninety-three.

Attest:

*Kenneth Evans*  
Commissioner  
Plant Variety Protection Office  
Agricultural Marketing Service

*Mike Egan*  
Secretary of Agriculture

U.S. DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) (as it is to appear on the Certificate) Pioneer Hi-Bred International, Inc.		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NO. XAL95	3. VARIETY NAME Capital
4. ADDRESS (street and no. or R.F.D. no., city, state, and ZIP) 7305 N. W. 62nd Ave., P. O. Box 287 Johnston, IA 50131		5. PHONE (include area code) 515-270-3340	FOR OFFICIAL USE ONLY PVPO NUMBER 9200221
6. GENUS AND SPECIES NAME Medicago sativa	7. FAMILY NAME (Botanical) Leguminosae		FILING Date June 22, 1992 Time 3:40 <input type="checkbox"/> A.M. <input checked="" type="checkbox"/> P.M.
8. CROP KIND NAME (Common Name) Alfalfa	9. DATE OF DETERMINATION August, 1983		FEE Filing and Examination Fee: \$ 2150.00
10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION (Corporation, partnership, association, etc.) Corporation			RECEIVE Date June 19, 1992 Certificate Fee: \$ 250.00
11. IF INCORPORATED, GIVE STATE OF INCORPORATION Iowa	12. DATE OF INCORPORATION 1926		Date April 12, 1993

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS  
William T. W. Woodward, 7305 N. W. 62nd Ave., P. O. Box 287, Johnston, IA 50131  
John Hintze, 700 Capital Square, 400 Locust Street, Des Moines, IA 50309  
Mike Roth, 700 Capital Square, 400 Locust Street, Des Moines, IA 50309

PHONE (include area code):

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow INSTRUCTIONS on reverse)

- a. ☒ Exhibit A, Origin and Breeding History of the Variety.
- b. ☒ Exhibit B, Novelty Statement.
- c. ☒ Exhibit C, Objective Description of Variety.
- d. ☒ Exhibit D, Additional Description of Variety.
- e. ☒ Exhibit E, Statement of the Basis of Applicant's Ownership.
- f. ☒ Seed Sample (2,500 viable untreated seeds). Date Seed Sample mailed to Plant Variety Protection Office 6-8-92.
- g. ☒ Filing and Examination Fee (\$2,150) made payable to "Treasurer of the United States."

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? (See section 83(a) of the Plant Variety Protection Act.)  
☐ YES (If "YES," answer items 16 and 17 below) ☒ NO (If "NO," skip to item 18 below)

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?  
☐ YES ☐ NO

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?  
☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.  
☐ YES (If "YES," through ☐ Plant Variety Protection Act ☐ Patent Act. Give date: \_\_\_\_\_.)  
☒ NO

19. HAS THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETING IN THE U.S. OR OTHER COUNTRIES?  
☒ YES (If "YES," give names of countries and dates) Italy, Spring of 1992  
☐ NO

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.  
The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in section 41, and is entitled to protection under the provisions of section 42 of the Plant Variety Protection Act.  
Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT [Owner(s)] PIONEER HI-BRED INTERNATIONAL, INC.	CAPACITY OR TITLE	DATE
SIGNATURE OF APPLICANT [Owner(s)] By <u>William T. W. Woodward</u>	Director, Department of Alfalfa Breeding	<u>6-8-92</u>

## EXHIBIT A

## ORIGIN AND BREEDING HISTORY OF THE VARIETY

## 'Capital'

Capital is a nine clone synthetic with parental clones replicated in "cage isolation". Seed harvested from each clone in 1982 and 1983 was bulked to produce Syn 1 breeder seed. Parental clones were selected on the basis of clonal evaluation for forage and seed yield, bacterial wilt, *Phytophthora* root rot, and spotted alfalfa aphid. Clonal selection for forage yield was based upon open-pollinated progeny tests at several locations. Parental clones trace through several intermediate experimental lines to: 532, Saranac AR, 531, Flemish, Saranac, Vernal, Culver, DuPuits, Anchor, Atra 55, and others with small contributions. Germplasm sources are: *M. falcata* (3%), Ladak (6%), *M. varia* (16%), Turkistan (3%), Flemish (65%), and Chilean (7%).

During seed multiplication no variates beyond the limits defined under Exhibit C have been found. Multiplication procedures will insure that seed being sold as Capital will not be shifted in characteristics beyond presently acceptable limits for alfalfa varieties. Syn 1 seed harvested from individual plants in "cage isolation" in 1989 is considered breeder seed.

It is confirmed that Capital meets presently acceptable levels for uniformity for alfalfa varieties.

9200221

EXHIBIT B

NOVELTY STATEMENT

'Capital'

Capital most closely resembles the variety 'Blazer'. Capital differs from Blazer in spotted alfalfa aphid resistance, being classified as having high resistance, while Blazer is susceptible to the insect.

U.S. DEPARTMENT OF AGRICULTURE  
AGRICULTURAL MARKETING SERVICE  
LIVESTOCK AND SEED DIVISION  
PLANT VARIETY PROTECTION OFFICE  
BELTSVILLE, MARYLAND 20705

EXHIBIT C  
(Alfalfa)

OBJECTIVE DESCRIPTION OF VARIETY  
ALFALFA (*Medicago sativa* sensu Gunn et al.)

NAME OF APPLICANT(S) Pioneer Hi-Bred International, Inc.	TEMPORARY DESIGNATION XAL95	VARIETY NAME Capital
ADDRESS (Street and No., or R.F.D. No., City, State, and Zip Code) 7305 N. W. 62nd Ave., P. O. Box 287 Johnston, IA 50131		FOR OFFICIAL USE ONLY PVPO NUMBER 9200221

PLEASE READ ALL INSTRUCTIONS CAREFULLY: Place numbers in the boxes to designate the expressions which are characteristic of the commercial generations of the application variety. Data for quantitative plant characters should be based on a minimum of 100 plants. Include leading zeros when necessary (e.g., 0 8 9) for quantitative data. Comparative data should be determined from varieties entered in the same trial. Plant color may be precisely designated by using any recognized color chart, e.g., The Munsell Plant Tissue Color Charts.

## 1. WINTERHARDINESS:

☐ CLASS:

- |  |                                      |
|--|--------------------------------------|
| 1 = Very Non-Winterhardy (CUF 101)           | 2 = Non-Winterhardy (Moapa 69)       |
| 3 = Intermediately Non-Winterhardy (Mesilla) | 4 = Semi-Winterhardy (Lahontan)      |
| 5 = (Du Puits)                               | 6 = Moderately Winterhardy (Saranac) |
| 7 = (Ranger)                                 | 8 = Winterhardy (Vernal)             |
| 9 = Extremely Winterhardy (Norseman)         |                                      |

TEST LOCATION: \_\_\_\_\_

## 2. FALL DORMANCY:

## FALL DORMANCY (DETERMINED FROM SPACED PLANTINGS)

TESTING INSTITUTION AND LOCATION	DATE OF LAST CUT	DATE REGROWTH SCORED	REGROWTH SCORE OR AVERAGE HEIGHT				LSD .05
			APPLICATION VARIETY	CHECK VARIETIES*			
				Vernal	Ranger	Saranac	
Pioneer Hi-Bred International, Inc. Owatonna, MN	9/84	10/84	9.5	7.9	8.6	9.1	0.76

\* CUF 101, Moapa 69, Mesilla, Lahontan, Du Puits, Saranac, Ranger, Vernal, or Norseman as appropriate.

Specify scoring system used: Average height in cm of space plants; six replications

☒ 5 Fall Growth Habit (Determined from Fall Dormancy Trials)

- |                            |                          |                            |
|----------------------------|--------------------------|----------------------------|
| 1 = Erect (CUF 101)        | 3 = Semierect (Mesilla)  | 5 = Intermediate (Saranac) |
| 7 = Semidecumbent (Vernal) | 9 = Decumbent (Norseman) |                            |

## 3. RECOVERY AFTER FIRST SPRING CUT (In Southwest, first cut after March 21):

☐

- |                          |                    |                           |                   |
|--------------------------|--------------------|---------------------------|-------------------|
| 1 = Very Fast (CUF 101)  | 3 = Fast (Saranac) | 5 = Intermediate (Ranger) | 7 = Slow (Vernal) |
| 9 = Very Slow (Norseman) |                    |                           |                   |

TEST LOCATION: \_\_\_\_\_

## 4. AREAS OF ADAPTATION IN U.S. (Where tested and proven adapted):

☒ 2 Primary Area of Adaptation

☐ 1 ☒ 6 Other Areas of Adaptation

- |  |                               |                  |               |
|--|-------------------------------|------------------|---------------|
| 1 = North Central  | 2 = East Central              | 3 = Southeast    | 4 = Southwest |
| 5 = Moderately Winterhardy Intermountain                           | 6 = Winterhardy Intermountain | 7 = Great Plains |               |
| 8 = Other (Specify) <u>Po River Valley, Italy; northern Europe</u> |                               |                  |               |



## 5. FLOWERING DATE (When 10% of plants possess open flowers at time of first spring cut):

<input type="text"/>	Days Earlier Than	<input type="text"/>
<input type="text"/>	Same As	<input type="text"/>
<input type="text"/>	Days Later Than	<input type="text"/>

- |             |             |             |            |              |
|-------------|-------------|-------------|------------|--------------|
| 1 = CUF 101 | 2 = Mesilla | 3 = Saranac | 4 = Vernal | 5 = Norseman |
|-------------|-------------|-------------|------------|--------------|

TEST LOCATION: \_\_\_\_\_

## 6. PLANT COLOR (Determined from healthy regrowth 3 weeks after first spring cut, controlling leafhoppers if necessary):

9200221

☐

1 = Very Dark Green (524)

2 = Dark Green (Vernal)

3 = Light Green (Ranger)

COLOR CHART VALUE (Specify chart used):

APPLICATION VARIETY:

VERNAL:

TEST LOCATION:

## 7. CROWN TYPE (Determined from spaced plantings):

☐

Noncreeping Types:

1 = Broad (Vernal)

2 = Intermediate (Saranac)

3 = Narrow (CUF 101)

Creeping Types:

4 = Creeping Rooted (Rangelander)

5 = Rhizomatous (Rhizoma)

## 8. FLOWER COLOR (Determine frequency of plants for each color class as defined by USDA Agricultural Handbook No. 424 (Barnes 1972), allowing all plants in plot to flower):

% Purple and Violet (Subclasses 1.1 to 1.4)

% Blue (Subclasses 2.3 and 2.4)

% Variegated Other Than Blue (Subclasses 2.1, 2.2, 2.5 to 2.9)

% Yellow (Subclasses 4.1 to 4.4)

% Cream (Class 3)

% White (Class 5)

TEST LOCATION: Johnston, IA; Connell, WA

## 9. POD SHAPE (Determine frequency of plants with the following pod shapes produced on well cross-pollinated racemes):

% Tightly Coiled (One or more coils, center more or less closed)

% Loosely Coiled (One or more coils, center conspicuously open)

% Sickle (Less than 1 coil)

TEST LOCATION:

10. PEST RESISTANCE: Provide in the appropriate column, trial data for application variety, and resistant (R) and susceptible (S) check varieties, synthetic generation tested, average severity index scores (ASI), least significant difference statistics (LSD .05), the institution in charge of test, year, and location of test, and whether test is a field or laboratory evaluation. Describe scoring system, and any test procedure which differs from standard methods proposed by Elgin (1982). Trial data from other test years or locations should be presented whenever available on a separate document as Exhibit D. Seeds of the check varieties and germplasm lines listed below can be obtained from the USDA Field Crops Laboratory, Bldg. 001, Rm. 335, BARC-West, Beltsville, MD 20705. Although comparisons with check varieties listed below are preferred, comparisons with any appropriate check variety recommended by Elgin (1982) may be presented.

A. DISEASE RESISTANCE:	DISEASE	VARIETY	SYN. GEN. TESTED	PERCENT RESISTANT PLANTS	NUMBER OF PLANTS TESTED	ASI	ASI LSD .05	INSTITUTION, YEAR, LOCATION, FIELD OR LABORATORY
Anthracnose, Race 1 ( <i>Colletotrichum trifolii</i> )	Application	S	2	7.7	~300		% Resistant Plants 12.10	Pioneer Hi-Bred International, Inc. 1992 Epuseau, France Laboratory
	Arc (R)			70.0	"			
	Saranac (S)			4.8	"			
	SCORING SYSTEM: % surviving plants. Data adjusted to Arc at 70% resistant plants by Pioneer Hi-Bred International, Inc.							
Anthracnose, Race 2 ( <i>Collectotrichum trifolii</i> )	Application							
	Saranac AR (R)							
	Arc (S)							
	SCORING SYSTEM:							
Bacterial Wilt ( <i>Corynebacterium insidiosum</i> )	Application	HR	2	54.4	~225	1.77	0.45	University of Minnesota 1991 Rosemount, MN Field
	Vernal (R)			42.0	"	2.22	% Resistant Plants 16.5	
	Naragansett (S)			0.8	"	4.00		
	SCORING SYSTEM: Plants scored 0 and 1 (on a 0-5 scale where 0=no disease and 5=dead plant) considered resistant. Data adjusted to Vernal at 42% resistant plants by the University of Minnesota.							
Common Leafspot ( <i>Pseudopeziza medicaginis</i> )	Application							
	MSA-CW3AN3 (R)							
	Ranger (S)							
	SCORING SYSTEM:							

## 10. A. PEST RESISTANCE (Continued):

9200221

DISEASE	VARIETY	SYN. GEN. TESTED	PERCENT RESISTANT PLANTS	NUMBER OF PLANTS TESTED	ASI	ASI LSD .05	INSTITUTION, YEAR, LOCATION, FIELD OR LABORATORY
Downy Mildew ( <i>Peronospora trifoliorum</i> )  Isolate, if known:	Application						
	Saranac (R)						
	Kanza (S)						
	SCORING SYSTEM:						
Fusarium Wilt ( <i>Fusarium oxysporum</i> f. <i>medicaginis</i> )	Application HR	2	60.0	~225	2.38	0.66	University of Minnesota 1991 Rosemount, MN Field
	Agate (R)		54.0	"	2.71	% Resistant	
	MNGN-1 (S)		5.1	"	4.69	Plants	
	SCORING SYSTEM: Plants scored 0 and 1 (on a 0-5 scale where 0=no disease and 5=dead plant) considered resistant. Data adjusted to Agate at 54% resistant						
Phytophthora Root Rot ( <i>Phytophthora megasperma</i> f. <i>medicaginis</i> )	Application MR	1	18.6	~225	4.1	1.0	Pioneer Hi-Bred International, Inc. 1985 Johnston, IA Field
	Agate (R)		43.0	"	5.7	% Resistant	
	Saranac (S)		1.9	"	2.3	Plants	
	SCORING SYSTEM: Plants scored 7-9 (on a 1-9 scale where 0=no disease and 1=dead plant) considered resistant. Data adjusted to Agate at 43% resistant						
Verticillium Wilt ( <i>Verticillium albo-atrum</i> )	Application LR	2	13.0	~225	1.83	0.21	Pioneer Hi-Bred International, Inc. 1991 Arlington, WI Laboratory
	Vertus (R)		40.0	"	2.84	% Resistant	
	Saranac (S)		3.0	"	1.30	Plants	
	SCORING SYSTEM: Plants scored 5-9 (on a 1-9 scale where 9=no disease and 1=dead plant) considered resistant. Data adjusted to Vertus at 40% resistant						
Other (Specify)	Application						plants by Pioneer Hi-Bred International, Inc.
	(R)						
	(S)						
	SCORING SYSTEM:						
Other (Specify)	Application						
	(R)						
	(S)						
	SCORING SYSTEM:						

## B. INSECT RESISTANCE:

INSECT	VARIETY	SYN. GEN. TESTED	PERCENT DEFOLIATION	DEFOLIATION IN PERCENT OF RESISTANT CHECK	ASI	ASI LSD .05	INSTITUTION, YEAR, LOCATION, FIELD OR LABORATORY
Alfalfa Weevil ( <i>Hypera postica</i> )	Application						
	Arc (R)			100			
	Saranac (S)						
	SCORING SYSTEM:						

## 10. B. INSECT RESISTANCE (Continued):

9200221

INSECT	VARIETY	SYN. GEN. TESTED	PERCENT SEEDLING SURVIVAL	NUMBER OF SEEDLINGS TESTED	ASI	ASI LSD .05	INSTITUTION, YEAR, LOCATION, FIELD OR LABORATORY
Blue Alfalfa Aphid ( <i>Acyrtosiphon kandoi</i> )	Application						
	CUF 101 (R)						
	PA-1 (S)						
	SCORING SYSTEM:						
Pea Aphid ( <i>Acyrtosiphon pisum</i> )	Application HR	1	90.8	~225		% Resistant Plants 17.9	Pioneer Hi-Bred 1984 Kerman, CA Laboratory
	<del>XXXXXX</del> Baker (R)		45.0	"			
	<del>XXXXXX</del> Vernal (S)		3.3	"			
	SCORING SYSTEM: Plants scored 5-9 (on a 1-9 scale where 9=no symptoms and 1=dead plant) considered resistant. Data adjusted to Baker at 45% resistant plants						
Spotted Alfalfa Aphid ( <i>Therioaphis maculata</i> )  Biotype, if known:	Application HR	2	56.8	~225	3.70	0.77 % Resistant Plants 17.5	Pioneer Hi-Bred International, Inc. 1991 Kerman, CA Laboratory
	<del>XXXXXX</del> Baker (R)		50.0	"	3.58		
	<del>XXXXXX</del> Arc (S)		0.0	"	1.00		
	SCORING SYSTEM: Plants scored 5-9 (on a 1-9 scale where 9=no damage and 1=dead plant) considered resistant. Data adjusted to Baker at 50% resistant plants						
Potato Leafhopper Yellowing ( <i>Empoasca fabae</i> )	Application						
	MSA-CW3An3 (R)						
	Ranger (S)						
	SCORING SYSTEM:						
Other (Specify)	Application						
	(R)						
	(S)						
	SCORING SYSTEM:						
C. NEMATODE RESISTANCE:							
NEMATODE	VARIETY	SYN. GEN. TESTED	PERCENT RESISTANT PLANTS	NUMBER OF PLANTS TESTED	ASI	ASI LSD .05	INSTITUTION, YEAR, LOCATION, FIELD OR LABORATORY
Northern Root Knot ( <i>Meloidogyne hapla</i> )	Application						
	New. Syn. XX (R)						
	Lahontan (S)						
	SCORING SYSTEM:						



NEMATODE	VARIETY	SYN. GEN. TESTED	PERCENT RESISTANT PLANTS	NUMBER OF PLANTS TESTED	ASI	ASI LSD .05	INSTITUTION, YEAR, LOCATION, FIELD OR LABORATORY
Southern Root Knot ( <i>Meloidogyne incognita</i> )	Application						
	Moapa 69 (R)						
	Lahontan (S)						
	SCORING SYSTEM:						
Stem Nematode ( <i>Ditylenchus dipsaci</i> )	Application MR	2	22.7	~225	4.23	0.42 % Resis- tant Plants 3.7	Pioneer Hi-Bred International, Inc. 1991 Connell, WA Laboratory
	Lahontan (R)		50.0	"	5.99		
	Ranger (S)		9.1	"	3.62		
	SCORING SYSTEM: Plants scored 5-9 (on a 1-9 scale where 9=no symptoms and 1=dead plant) considered resistant. Data adjusted to Lahontan at 50% resistant plants by Pioneer Hi-Bred International, Inc.						
Other (Specify)	Application						
	(R)						
	(S)						
SCORING SYSTEM:							

## 11. INDICATE THE VARIETY THAT MOST CLOSELY RESEMBLES THE APPLICATION VARIETY FOR EACH OF THE FOLLOWING CHARACTERS:

CHARACTER	VARIETY	CHARACTER	VARIETY
Winterhardiness	5364	Plant Color	-
Recovery After 1st Cut	5364	Crown Type	5432
Area of Adaptation	5432	Combined Disease Resistance	Blazer
Flowering Date	-	Combined Insect Resistance	5364

## REFERENCES

Barnes, D.K. 1972. A System for Visually Classifying Alfalfa Flower Color. U.S. Dep. Agric. Handb. 424. 18 pp. (Note: Greenish cast of plate 6, A and B is an artifact of printing, actual colors a blend of yellow and white.)

Elgin, J.H., Jr., (ed.). 1982. Standard Tests to Characterize Pest Resistance in Alfalfa Cultivars. U.S. Dep. Agric. Tech. Bull. (In Press).

Gunn, C.R., W.H. Skrdla, and H.C. Spencer. 1978. Classification of *Medicago sativa* L. using legume characters and flower colors. U.S. Dep. Agric. Tech. Bull. 1574. 84 pp.

Munsell Color Co. 1977. Munsell Plant Tissue Color Charts. Munsell Color Co., Inc. Baltimore.

NOTE: Any additional descriptive information and supporting documentation may be provided as Exhibit D.

## EXHIBIT D

'Capital'

APPLICATION FOR REVIEW OF ALFALFA VARIETIES FOR CERTIFICATION  
National Alfalfa Variety Review Board

(The criteria for evaluation of applications were developed by the Joint Alfalfa Work Conference and the Association of Official Seed Certifying Agencies.)

Applicant's Name Pioneer Hi-Bred International, Inc. Date 11-8-91  
 Address P. O. Box 287, Johnston, Iowa 50131  
 Sponsoring Institution (if other than applicant) \_\_\_\_\_  
 Breeder's Name (if other than applicant) \_\_\_\_\_  
 Variety Name Capital Experimental Designation(s) 82B-1, YAL95, XAL95

Applicant's Signature \_\_\_\_\_

The breeder or sponsoring institution or organization must describe and DOCUMENT in this application those characteristics of the variety which give it distinctiveness and merit by supplying the information requested below. Information must be supplied for each category excepting those listed as optional. Action will be deferred unless the application is sufficiently documented.

At the time a variety is accepted for certification, a seed sample of the generation or generations requested by the certifying agency shall be submitted to the certifying agency by the sponsor. This lot(s) is to be retained as a control sample against which all future seed stocks released for certified seed production may be compared to establish continued trueness of variety.

- I. A. Estimate the % of the germplasm sources listed below that contribute to the major genetic constitution of this variety.

<u>M.falcata</u>	<u>Ladak</u>	<u>M.varia</u>	<u>Turkistan</u>	<u>Flemish</u>	<u>Chilean</u>
<u>3</u>	<u>6</u>	<u>16</u>	<u>3</u>	<u>65</u>	<u>7</u>
<u>Peruvian</u>	<u>Indian</u>	<u>African</u>	<u>Arabian</u>	<u>Unknown</u>	
_____	_____	<u>1</u>	_____	_____	

- B. A statement of origin (including variety names, germplasm releases and/or PI numbers, and the number of plants or % contribution from each) and the breeding procedures or methods and selection criteria used in developing the variety. Include the procedure for producing breeder seed, the generation (e.g. Syn 1, Syn 2, etc.) that is considered breeder seed, and the year of breeder seed production.

## Page 2 - Capital

Capital is a nine clone synthetic variety with clones replicated in "cage isolation". Seed harvested from each clone in 1982 and 1983 was bulked to produce Syn 1 breeder seed. One or more of the parental clones were selected on the basis of clonal evaluation for forage and seed yield, bacterial wilt, Phytophthora root rot, and spotted alfalfa aphid. Clonal selection for forage yield was based upon open-pollinated progeny row tests at several locations. Parental clones trace through several intermediate experimental lines to 532, Saranac AR, 531, Flemish, Saranac, Vernal, Culver, DuPuits, Anchor, Atra 55, and other germplasms with minor contributions.

C. Seed class to be used, limitations on age of stand and areas of production for each class.

Seed Class	Synthetic Generation	Length of Stand Allowed	Limitation on Acres for Seed Production
Breeder	1	Two	None
Foundation	2 or 3	Three	None
Certified	2, 3 or 4	Five	None

Only the synthetic generations given for the above seed classes are recognized as representing this variety. (No supporting data should be used in this application from Syn generations other than those for the Breeder, Foundation and Certified Classes listed here).

D. Procedures for maintaining seed stock:

Breeder seed (Syn 1) produced on replicated parental clones in "cage isolation" over a two year period was bulked. Seed classes will be breeder, foundation and certified. Foundation seed may be produced from breeder or foundation. The second generation foundation seed may be produced at the discretion of Pioneer Hi-Bred International, Inc. Both breeder and foundation seed will be maintained by Pioneer Hi-Bred International, Inc. Certified seed may be produced from breeder or foundation.

E. Any other requirements or limitations necessary to maintain varietal characteristics? None

II. A. Describe the primary use of this variety (if for uses other than hay, haylage, greenchop or dehydration):

B. List states and areas within states where tested for forage and/or persistence. (Present data from each location in III.A. and III.B.). Johnston, IA; Yuba, WI; Owatonna, MN; Toledo, IA; Phelps, NY; Connell, WA; Lancaster, PA; Buckeystown, MD; Davis, IL; Edgar, WI; Litchfield, MI; Marlette, MI; Tipton, IN; Hermiston, OR; Moses Lake, WA; Reggio Emilia, Italy; Ravenna, Italy; Cremona, Italy; La Rocca Bianca, Italy; Frouville, France.

C. List:

1. Areas of adaptation. North central, east central, winterhardy intermountain, northern Europe, northern Italy

2. Areas of intended use. Po River Valley of Italy

III. Evidence of agronomic performance, including data on yield (in T/A) and persistence. Data may be from tests conducted by private firms, Agricultural Experiment Stations or USDA.

A. Minimum required forage yield data is six location years with at least two locations (two locations must be at least 100 miles apart). Seeding year forage yield data cannot be used to satisfy this requirement. One location must have at least two harvest years beyond seeding year. Each harvest year should be listed separately.

Note: For non-dormant varieties (dormancy level of Moapa 69 or CUF 101) seeding year data may be accepted for up to two of the six location years when four or more cuttings are made in the seeding year.

Summarize Forage Yield Data below:

Test Location	Date Plntd Mo/Yr	Syn Gen	Year Hvst	No. Cuts	This Variety	Total Yield (DM T/A)			LSD .05	CV%
						2. 532	3. SAR	AR		
JOHNSTON, IA	4/83	1	84	4	7.1	7.3	7.4		0.80	6.6
		1	85	4	6.9	7.1	5.8		0.90	8.0
YUBA, WI	5/83	1	84	3	5.8	5.3	4.5		0.73	8.8
		1	85	1	2.9	2.4	2.4		0.59	14.8
OWATONNA, MN	4/83	1	84	3	5.5	5.6	5.2		0.53	6.0
		1	85	4	6.4	6.7	5.1		0.55	5.0
TOLEDO, IA	4/83	1	84	4	6.5	6.5	6.0		0.78	7.5
		1	85	4	6.6	7.3	5.4		0.81	7.2
PHELPS, NY	4/83	1	84	3	6.6	7.0	7.5		1.02	8.7
		1	85	4	7.7	7.3	8.4		0.92	7.1

Forage yield data cont.

Test Location	Date Plntd Mo/Yr	Syn Gen	Year Hvst	No. Cuts	This Variety	Total Yield (DM T/A)			LSD .05	CV%
						2. 532	3. SAR AR			
CONNELL, WA	4/83	1	84	3	7.8	7.2	6.6	0.69	5.8	
		1	85	5	10.7	10.9	10.3	1.21	7.2	
LANCASTER, PA	4/83	1	84	4	8.3	7.3	7.3	0.81	6.7	
		1	85	4	7.8	6.5	6.6	0.82	7.7	
BUCKEYSTOWN, MD	3/83	1	84	4	8.4	7.7	8.1	0.76	5.5	
		1	85	5	9.3	8.2	8.1	0.76	5.4	
DAVIS, IL	4/83	1	84	4	9.0	7.9	8.4	0.81	6.0	
		1	85	3	5.5	4.8	4.3	0.53	6.4	
EDGAR, WI	5/83	1	84	3	5.2	5.4	5.7	0.69	6.0	
LITCHFIELD, MI	5/83	1	84	4	5.5	5.5	5.2	0.58	6.6	
		1	85	3	4.1	3.8	3.6	0.29	4.5	
MARLETTE, MI	5/83	1	84	4	7.9	7.7	7.3	0.63	5.2	
		1	85	3	4.9	4.8	4.0	0.67	8.7	

## Mean Annual Yield

	Years Hvstd	Total No. of Hvsts		
Ck 2 comparison	23	83	6.8	6.5
Ck 3 comparison	23	83	6.8	6.2

Test Location	Date Plntd Mo/Yr	Syn Gen	Year Hvst	No. Cuts	This Variety	Total Yield (DM T/A)			LSD .05	CV%
						2. 5432	3. SARANAC			
JOHNSTON, IA	4/84	1	85	4	7.1	7.1	6.6	7.2	0.86	
		1	86	4	6.7	6.9	6.5	6.9	0.76	
OWATONNA, MN	4/84	1	85	4	6.7	7.0	5.8	8.9	0.97	
		1	86	4	8.1	7.2	6.2	8.0	0.95	
TOLEDO, IA	4/84	1	85	4	7.6	7.4	7.1	4.7	0.57	
		1	86	4	6.4	6.0	5.7	5.3	0.53	
TIPTON, IN	4/84	1	85	4	6.7	6.5	6.8	4.7	0.53	
		1	86	3	4.2	4.3	3.8	5.2	0.35	

Yield data cont.

Test Location	Date Plntd Mo/Yr	Syn Gen	Year Hvst	No. Cuts	This Variety	Total Yield (DM T/A)		LSD .05	CV%
						2. 5432	3. SARANAC		
LITCHFIELD, MI	5/84	1	85	3	3.3	3.5	3.8	9.4	0.52
		1	86	4	7.6	7.5	7.6	5.4	0.68
MARLETTE, MI	5/84	1	85	3	3.7	3.7	3.6	12.4	0.76
		1	86	4	7.1	7.0	6.4	6.7	0.74
PHELPS, NY	4/84	1	85	4	5.9	6.0	6.0	4.6	0.43
		1	86	4	7.8	8.4	7.9	7.0	0.88
LANCASTER, PA	4/84	1	85	4	6.6	6.1	5.9	5.8	0.59
		1	86	4	6.0	5.9	4.9	8.9	0.82
BUCKEYSTOWN, MD	3/84	1	85	5	8.2	7.0	7.0	6.0	0.73
		1	86	4	6.1	5.6	6.0	7.7	0.74
HERMISTON, OR	4/84	1	85	5	13.6	13.0	13.3	5.1	1.10
		1	86	5	13.9	12.4	11.3	5.2	1.06
CONNELL, WA	4/84	1	85	5	12.1	12.4	12.0	4.2	0.84
		1	86	5	10.8	11.1	11.0	5.2	0.91
MOSES LAKE, WA	4/84	1	85	4	10.6	10.4	10.8	6.2	1.10
		1	86	4	8.0	8.1	7.6	5.9	0.79
DAVIS, IL	4/84	1	85	4	6.1	6.3	5.9	6.6	0.64
		1	86	3	7.7	7.4	6.9	6.1	0.75
ARLINGTON, WI	5/84	1	85	5	7.6	7.1	6.6	7.2	0.83
		1	86	4	7.0	7.4	5.9	6.7	0.76

## Mean Annual Yield

	Years Hvstd	Total No. of Hvsts		
Ck 2 comparison	28	114	7.6	7.5
Ck 3 comparison	28	114	7.6	7.1

Test Location	Date Plntd Mo/Yr	Syn Gen	Year Hvst	No. Cuts	This Variety	Total Yield (DM T/A)		LSD .05	CV%
						2. EUROPE	3. ROBOT		
REGGIO EMILIA ITALY	3/87	1	87	2	2.6	2.2	2.3	0.28	9.0
			88	4	5.0	4.4	4.7	0.47	7.4
			89	2	3.1	2.5	2.9	0.37	10.3
RAVENNA ITALY	3/87	1	87	2	0.7	0.8	0.7	0.14	15.2
			88	3	2.8	3.0	2.7	0.35	9.4
CREMONA ITALY	3/87	1	88	5	7.4	7.1	8.0	0.76	7.5
			89	3	5.0	3.7	5.2	0.64	9.7
LA ROCCA BIANCA, ITALY	3/87	1	91	5	7.8	7.6	7.7	0.61	5.7
FROUVILLE FRANCE	3/90	1	91	4	5.2	4.8	4.3	0.86	11.4

## Mean Annual Yield

	Years Hvstd	Total No. of Hvsts		
Ck 2 comparison	9	30	4.4	4.0
Ck 3 comparison	9	30	4.4	4.3

B. Persistence (winter and drought tolerance, summer survival relative to check varieties). Enter dates of both Initial and Final stand estimates. Data must come from the area of adaptation and from stands at least two years old. More than one location must be given either when persistence is a trait used to justify release or when large diverse geographic areas of adaption are recommended.

Test Loc.	Syn Gen	Date Seeded (Yr/Mo)	Yrs. Hvtd	No. Hvts	Date of Readings Init/Final (Yr/Mo)	This Variety In/Fnl	%Stand Check Varieties		LSD .05	CV%
							532 In/Fnl	SAR AR In/Fnl		
1.	1	83/4	3	9	83/5 85/9	95.8 87.5	93.9 85.3	92.5 70.8	5.10 10.22	3.2 7.2
2.	1	83/5	3	9	83/7 85/9	96.7 84.4	93.9 82.5	94.4 77.5	4.90 6.56	3.1 4.9

1. = Owatonna, MN  
2. = Marlette, MI

## Page 7 - Capital

Scoring system used: Data taken as missing six inch units within each plot with total plot size = 120 units.

Test Loc.	Syn Gen	Date Seeded (Yr/Mo)	Yrs. Hvtd	No. Hvts	Date of Readings Init/Final (Yr/Mo)	%Stand This Check Varieties			LSD .05	CV%
						Variety	EUROPE	ROBOT		
						In/Fnl	In/Fnl	In/Fnl		
1.	1	86/3	3	12	87/4 88/10	99.6 98.6	99.3 98.6	99.2 98.3	0.76 4.07	0.54 3.12

1. = REGGIO EMILIA, ITALY

Scoring system used: Data taken as missing 15 cm units within each plot with total plot size = 250 units.

- C. Fall dormancy as determined from spaced plantings relative to recognized varieties; check varieties must be chosen so as to bracket the dormancy data of this variety.

1. Test data

Test Location	Syn Gen	Date Last Cut (Yr/Mo)	Date Measured (Yr/Mo)	Score or average height				LSD .05	CV%
				This Variety	Check 1.	2.	Varieties 3. 4.		
Owatonna, MN	1	84/9	84/10	9.5	7.9	8.6	9.1 9.7	0.76	7.5

1. = Vernal  
2. = Ranger  
3. = Saranac  
4. = 5364

Scoring system used: Average height in cm of space plants, six replications

2. Indicate which of the following check varieties this variety most nearly compares to in fall dormancy.

VERY DORMANT	DORMANT	MODERATELY DORMANT	NON-DORMANT	VERY NON-DORMANT
Norseman ( )	Vernal ( ) Ranger ( )	Saranac (x) DuPuits ( ) Lahontan ( )	Mesilla ( ) Moapa 69 ( )	CUF 101 ( )



## IV. Other descriptive characteristics

- A. Flower color at full bloom. Syn generation observed  
1 (see USDA Agriculture Handbook No. 424 - A System  
 for Visually Classifying Alfalfa Flower Color).

99.4 % purple	t % cream	t % yellow
<u>0.6</u> % variegated	<u>t</u> % white	

- B. (Document other distinctive characteristics such as pod, leaf or root traits, biochemical markers, etc.)

## V. Pest Resistance Characteristics

PLEASE FOLLOW THESE INSTRUCTIONS CAREFULLY WHEN REPORTING PEST RESISTANCE RESULTS.

Furnish comparative data on the following insects and diseases (and others where applicable) for your variety. Data may be from tests conducted by private firms, Agricultural Experiment Stations, or USDA. Tests should be conducted by standard procedures as described in ARS Misc. publication 1434. Each disease and insect test must include published resistant and susceptible checks. Statistics must include the test mean (mean of all entries in test), LSD (.05), and CV (%) for unadjusted % resistance and ASI data that are reported. Resistance levels should be characterized using % resistant plants as follows: S=<6%, LR=6-14%, MR=15-30%, R=31-50%, HR=>50%. Do not refer to tolerance. Checks should be characterized based on long term % resistance averages published in ARS Misc. publication 1434. If data for the resistant check does not fit its expected resistance class (MR, R, HR, etc.) data must be adjusted to the long term mean for the published resistant check. If data has been adjusted, supply both adjusted and unadjusted values and indicate how and by whom the adjustment was made.

At the time a variety is accepted for certification, a seed sample of the generation or generations requested by the certifying agency shall be submitted to the certifying agency by the sponsor. This lot(s) is to be retained as a control sample against which all future seed stocks released for certified seed production may be compared to establish continued trueness of variety.

If a scoring or rating system is used, specify the limits and meaning of scores. NOTE: If a pest reaction of the variety falls on or just above a resistance category level (+2% for LR, MR, and R; +3% for HR) and the higher rating is claimed, results of a second test must be reported. If the two tests do not agree, the lower rating is appropriate unless further testing supports the higher rating. Pest resistance data must be submitted on at least six of the following nine pests: anthracnose, bacterial wilt, Fusarium wilt, Verticillium wilt, Phytophthora root rot, stem nematode, pea aphid, spotted alfalfa

aphid, and blue alfalfa aphid. For the pests where no data is available enter "Not tested". The six required pests must be selected from those that frequently cause significant losses on susceptible cultivars in the area of intended use of this variety. Show generation of seed used for each test.

## ANTHRACNOSE (Race 1)

Test conducted by \_\_\_\_\_ at \_\_\_\_\_

Variety	Resistance Class	Year Tested	Syn Gen	Unadjusted % R	Adjusted % R	Score or A.S.I.
---------	------------------	-------------	---------	----------------	--------------	-----------------

## Test Variety

1.						
2.						
3.						

NOT TESTED

Test Mean:  
L.S.D. (.05)  
C.V. (%)

Scoring system used: \_\_\_\_\_

## BACTERIAL WILT

Test conducted by University of Minnesota at Rosemount, MN

Variety	Resistance Class	Year Tested	Syn Gen	Unadjusted % R	Adjusted % R	Score or A.S.I.
---------	------------------	-------------	---------	----------------	--------------	-----------------

Test Variety	HR	1991	2	47.3	54.4	1.77
1. VERNAL	R			36.5	42.0	2.22
2. NARRAGANSETT	S			0.7	0.8	4.00
3.						

Test Mean:				47.3	54.5	1.88
L.S.D. (.05)				14.4	16.5	0.45
C.V. (%)				18.8	18.8	14.80

Scoring system used: Plants scored 0 and 1 (on a 0-5 scale, where 0 = no disease and 5 = dead plant) considered resistant. Data adjusted to Vernal at 42% resistant plants by the University of Minnesota.

**FUSARIUM WILT**Test conducted by University of Minnesota at Rosemount, MN

Variety	Resistance Class	Year Tested	Syn Gen	Unadjusted % R	Adjusted % R	Score or A.S.I.
Test Variety	HR	1991	2	53.4	60.0	2.38
1. AGATE	HR			48.0	54.0	2.71
2. NARRAGANSETT	MR			20.2	22.7	3.89
3. MNGN-1	S			4.6	5.1	4.69
Test Mean:				53.4	60.0	2.49
L.S.D. (.05)				15.9	17.8	0.66
C.V. (%)				18.5	18.5	16.60

Scoring system used: Plants scored 0 and 1 (on a 0-5 scale, where 0 = no disease and 5 = dead plant) considered resistant. Data adjusted to Agate at 54% resistant plants by the University of Minnesota.

**VERTICILLIUM WILT**Test conducted by Pioneer Hi-Bred International, Inc. at Arlington, WI

Variety	Resistance Class	Year Tested	Syn Gen	Unadjusted % R	Adjusted % R	Score or A.S.I.
Test Variety	LR	1991	2	10	13	1.83
1. VERTUS	R			30	40	2.84
2. SARANAC	S			2	3	1.30
3.						
Test Mean:				19.7	26.3	2.30
L.S.D. (.05)				10.1	13.5	0.21
C.V. (%)				42.0	42.0	23.00

Scoring system used: Plants scored 5-9 (on a 1-9 scale, where 9 = no disease, and 1 = dead plant) considered resistant. Data adjusted to Vertus at 40% resistant plants by Pioneer Hi-Bred International, Inc.

## PHYTOPHTHORA ROOT ROT

Test conducted by Pioneer Hi-Bred International, Inc. at Johnston, IA

Variety	Resistance Class	Year Tested	Syn Gen	Unadjusted % R	Adjusted % R	Score or A.S.I.
Test Variety	MR	1985	1	21.5	18.6	4.1
1. AGATE	R			49.7	43.0	5.7
2. SARANAC	S			2.2	1.9	2.3
3.						
Test Mean:				25.8	22.3	4.3
L.S.D. (.05)				15.5	13.4	1.0
C.V. (%)				37.5	37.5	14.5

Scoring system used: Plants scored 7-9 (on a 1-9 scale, where 9 = no disease, and 1 = dead plant) considered resistant. Data adjusted to Agate at 43% resistant plants by Pioneer Hi-Bred International, Inc.

## STEM NEMATODE

Test conducted by Pioneer Hi-Bred International, Inc. at Connell, WA

Variety	Resistance Class	Year Tested	Syn Gen	Unadjusted % R	Adjusted % R	Score or A.S.I.
Test Variety	MR	1991	2	24.3	22.7	4.23
1. LAHONTAN	R			53.6	50.0	5.99
2. RANGER	S			9.8	9.1	3.62
3.						
Test Mean:				35.1	32.8	4.90
L.S.D. (.05)				4.0	3.7	0.42
C.V. (%)				7.0	7.0	5.00

Scoring system used: Plants scored 5-9 (on a 1-9 scale, where 9 = no symptoms and 1 = dead plant) considered resistant. Data adjusted to Lahontan at 50% resistant plants By Pioneer Hi-Bred International, Inc.

## PEA APHID

Test conducted by Pioneer Hi-Bred International, Inc. at Kerman, CA

Variety	Resistance Class	Year Tested	Syn Gen	Unadjusted % R	Adjusted % R	Score or A.S.I.
Test Variety	HR	1984	1	76.3	90.8	
1. BAKER	R			37.8	45.0	
2. KANZA	R			35.3	42.0	
3. VERNAL	S			2.8	3.3	
Test Mean:				39.0	46.4	
L.S.D. (.05)				15.0	17.9	
C.V. (%)				27.3	27.3	

Scoring system used: Plants scored 8-9 (on a 1-9 scale, where 9 = no symptoms and 1 = dead plant) considered resistant. Data adjusted to Baker at 45% resistant plants by Pioneer Hi-Bred International, Inc.

## SPOTTED ALFALFA APHID

Test conducted by Pioneer Hi-Bred International, Inc. at Kerman, CA

Variety	Resistance Class	Year Tested	Syn Gen	Unadjusted % R	Adjusted % R	Score or A.S.I.
Test Variety	HR	1991	2	41.0	56.8	3.70
1. BAKER	R			36.1	50.0	3.58
2. ARC	S			0.0	0.0	1.00
3. CALIVERDE	S			0.7	1.0	1.06
Test Mean:				29.5	40.9	3.00
L.S.D. (.05)				12.6	17.5	0.77
C.V. (%)				26.0	26.0	16.00

Scoring system used: Plants scored 5-9 (on a 1-9 scale, where 9 = no damage and 1 = dead plant) considered resistant. Data adjusted to Baker at 50% resistant plants by Pioneer Hi-Bred International, Inc.

## BLUE ALFALFA APHID

Test conducted by \_\_\_\_\_ at \_\_\_\_\_

Variety	Resistance Class	Year Tested	Syn Gen	Unadjusted % R	Adjusted % R	Score or A.S.I.
---------	---------------------	----------------	------------	-------------------	-----------------	--------------------

Test Variety

1.  
2.  
3.

NOT TESTED

Test Mean:  
L.S.D. (.05)  
C.V. (%)

Scoring system used: \_\_\_\_\_

Please attach a one page description/summary of your variety as you wish it published by AOSCA. This description must stand on its own; please use complete sentences and number each item following the format given below.

Include the following:

1. A statement of genetic origin (including variety names, germplasm releases, and/or PI numbers that contributed to the major genetic constitution of this variety) and the breeding procedures, methods, and selection criteria used in developing the variety. Estimate the % of the major germplasm sources contributing to this cultivar. (see I.A.)
2. Area of probable adaptation and use (geographic area) and primary purpose (hay, grazing, etc.) for which this variety will be used. Report states where the variety has been tested for yield and persistence and proposed areas of intended use.
3. Descriptive characteristics such as fall dormancy, flower color, and any other morphological or physiological characteristics that may be used as identifying traits.
4. A statement relative to the varieties resistance to anthracnose, bacterial wilt, Fusarium wilt, Verticillium wilt, Phytophthora root rot, stem nematode, pea aphid, spotted alfalfa aphid, and blue alfalfa aphid and other evaluated pests.
5. Procedures for maintaining seed stock, seed classes to be used, a statement as to the limitation of age of stand and generations that may be certified and other requirements or limitations necessary to maintain varietal characteristics.
6. If this variety is accepted by official certifying agencies, when will certified seed first be offered for sale?
7. Will application be made for protection under the Plant Variety Protection Act and if so, will the certification option be requested?
8. As a means of added varietal protection, are you willing to have the information in this application turned over to the PVP office?

## CAPITAL

1. Capital is a nine clone synthetic with parental clones replicated in "cage isolation". Seed harvested from each clone in 1982 and 1983 was bulked to produce Syn 1 breeder seed. Parental clones were selected on the basis of clonal evaluation for forage and seed yield, bacterial wilt, Phytophthora root rot, and spotted alfalfa aphid. Clonal selection for forage yield was based upon open-pollinated progeny tests at several locations. Parental clones trace through several intermediate experimental lines to: 532, Saranac AR, 531, Flemish, Saranac, Vernal, Culver, DuPuits, Anchor, Atra 55, and others with small contributions. Germplasm sources are: *M. falcata* (3%), Ladak (6%), *M. varia* (16%), Turkistan (3%), Flemish (65%), and Chilean (7%).
2. Capital is adapted to the north central, east central, and winterhardy intermountain regions of the United States as well as northern Europe and northern Italy. It is intended for use in the Po River Valley of Italy and in northern Europe. It's primary purpose is for hay, haylage, greenchop and dehydration. The states in which Capital have been tested are: Iowa, Minnesota, Indiana, Michigan, New York, Pennsylvania, Maryland, Oregon, Washington, Illinois and Wisconsin. It has also been tested in France and several locations in Italy.
3. Capital is a moderately dormant cultivar with fall dormancy similar to Saranac. Flower color of the Syn 2 generation is approximately 99% purple, 1% variegated and a trace of yellow, white and cream. Growth habit is erect in midsummer and semi-erect in the fall.
4. Capital has high resistance to bacterial wilt, Fusarium wilt, pea aphid and spotted alfalfa aphid; moderate resistance to Phytophthora root rot and stem nematode; and low resistance to Verticillium wilt. Capital has not been tested for anthracnose or blue alfalfa aphid.
5. Breeder seed (Syn 1) produced on replicated parental clones in "cage isolation" over a two year period was bulked. Seed classes will be breeder, foundation (Syn 2 or Syn 3) and certified (Syn 2, Syn 3 or Syn 4). Foundation seed may be produced from breeder or foundation. The second generation foundation seed may be produced at the discretion of Pioneer Hi-Bred International, Inc. Limitations of age of stand will be three and five years for foundation and certified seed, respectively. Sufficient breeder and foundation seed for the projected life of the variety will be maintained by Pioneer Hi-Bred International, Inc.
6. Seed will be marketed in the spring of 1992.
7. Application for Plant Variety Protection will be made and the certification option will not be requested.
8. As a means of added varietal protection, information included with the Application for Review of Alfalfa Variety for Certification may be provided to the PVP office.



## EXHIBIT E

## STATEMENT OF THE BASIS OF APPLICANT'S OWNERSHIP

## 'Capital'

Pioneer Hi-Bred International, Inc., Des Moines, Iowa, is the employer of the plant breeders involved in the development and evaluation of Capital. Pioneer Hi-Bred International, Inc. has the sole rights and ownership of Capital.